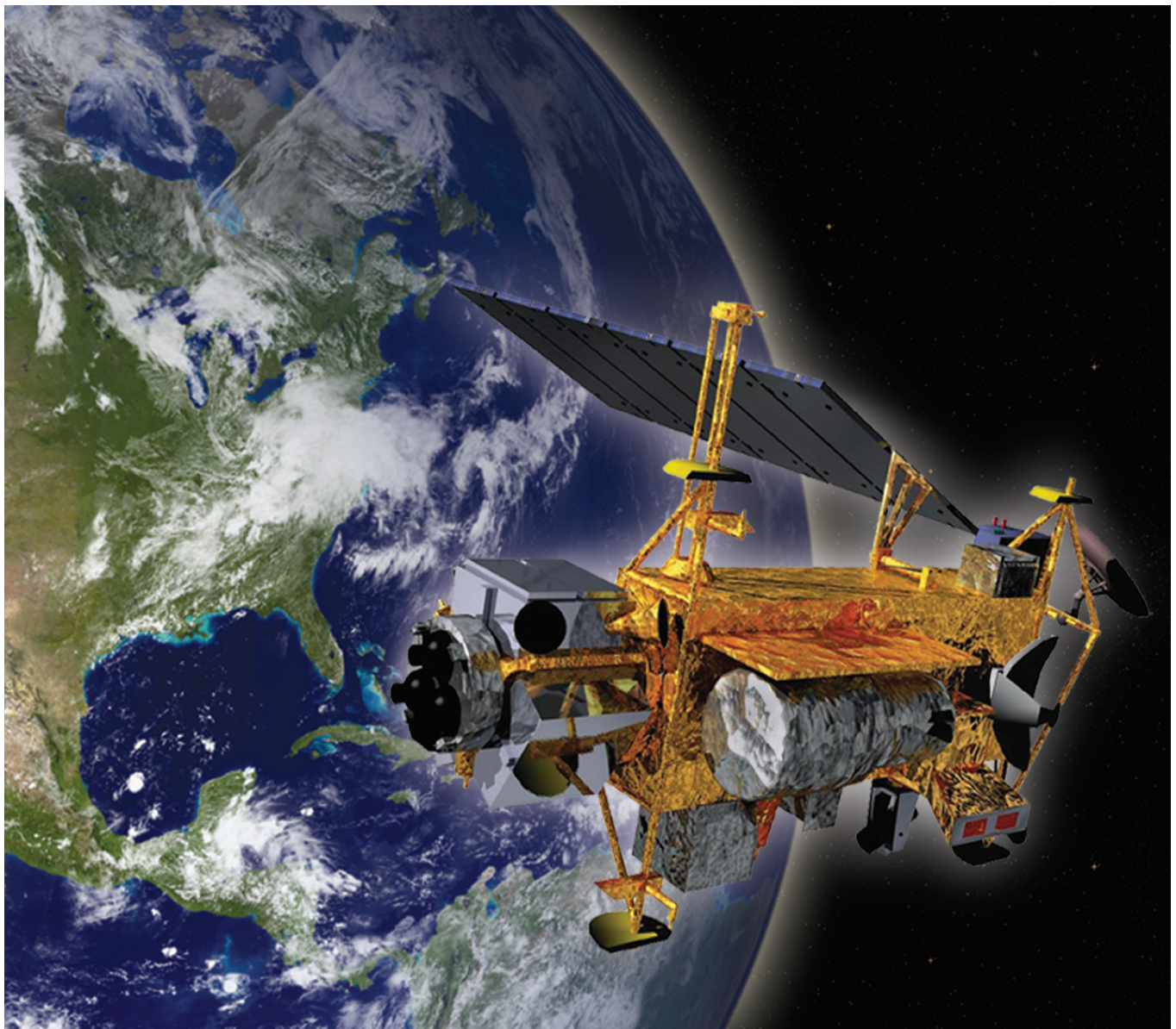
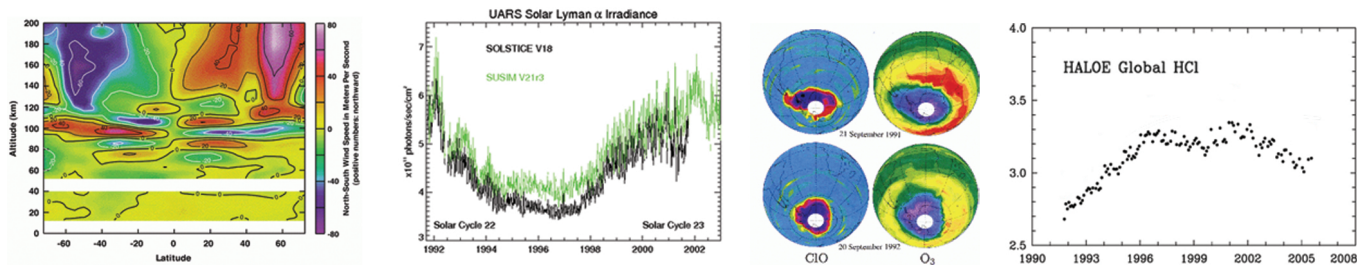


Laboratory for Atmospheres 2005 Technical Highlights



Cover Caption

Central figure. Artist's concept of the Upper Atmosphere Research Satellite (UARS) orbiting above Earth. UARS was launched in September 1991 and decommissioned in December 2005, after a 14-year mission.

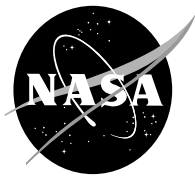
Graphics at top of cover page (left to right):

Far left. Composite of measured meridional winds from the UARS High Resolution Doppler Image (HRDI) and Wind Imaging Interferometer (WINDII) instruments for the spring periods of 1993 and 1994 in the altitude range of 10–200 km and from -60° to 60° latitude for a local time of 12:00. The color bar indicates wind speeds from -80 to 80 m/s (positive northward). The prominent oscillations about the equator in the Mesosphere–Lower thermosphere (MLT) region are due to “atmospheric tides” driven by the daily change in solar heating. [Figure courtesy of Mark D. Burrage (deceased).]

Middle left. Variations in solar irradiance of Lyman α (121.6 nm) over about 11 years (late 1991 through the end of 2002) measured by the UARS (Solar Ultraviolet Spectral Irradiance monitor (SUSIM, in green) and Solar/Stellar Irradiance Comparison Experiment (SOLSTICE, in black) instruments. These ultraviolet flux measurements tracked the general solar irradiance decrease from a peak near the maximum of solar cycle 22 through a minimum in 1996 up to the maximum of solar cycle 23. Changes in solar irradiance at Lyman α from solar minimum to maximum are over 50%, a very substantial change. (Figure courtesy of Linton E. Floyd.)

Middle right. Chlorine monoxide (ClO) and ozone (O_3) in the Southern Hemisphere on 21 September 1991 (upper half of figure) and 20 September 1992 (lower half). The mapped quantities are vertical columns obtained by integrating the profiles retrieved from UARS Microwave Limb Sounder (MLS). High ClO amounts are indicated by the more brilliant red and purple colors. Low O_3 amounts are indicated by the more muted light blue and violet colors. The strong anti-correlation between high ClO and low O_3 indicates that the ClO is responsible for the O_3 destruction. (Figure courtesy of Joseph W. Waters.)

Far right. Time series of UARS Halogen Occultation Experiment (HALOE) global average hydrogen chloride (HCl) mixing ratio measurements (in parts per billion) at 55 km between late 1991 and 2005. The increases in HCl from late 1991 to 1997 were probably caused by increases in human-produced chlorofluorocarbon (CFC) gases. The decreases in HCl after 2001 were likely caused by international regulations limiting the production of CFC gases. Variations between 1997 and 2001 are not well understood at the present time. (Figure courtesy of James M. Russell, III.)



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